

HABITAT AREAS OF PARTICULAR CONCERN (HAPC) PROPOSALS

Please check applicable box (es):

- ☐ GOA Groundfish FMP
- ☒ BSAI Groundfish FMP
- ☐ Scallop FMP
- ☒ BSAI Crab FMP
- ☐ Salmon FMP

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Title and Brief Statement of Proposal:

Bering Sea Soft Corals and Seamounts

The Bering Sea is home to the biggest flatfish fishery in the United States. It is also the only known place in Alaska waters to have incredibly dense aggregations of *Gersemia sp.*, also known as sea raspberries. These delicate living seafloor creatures are soft corals that provide essential fish habitat for a myriad of marine life. Yet they and other important living seafloor substrate are removed in alarming numbers by destructive bottom trawling. These essential fish habitat HAPCs need further study and protection to ensure we maintain a healthy Bering Sea Ecosystem. The Bering Sea is also home to the MEDNYY Seamount.

Objectives of Proposal:

(Identification of the habitat and FMP species the HAPC proposal is intended to protect.)

The objectives of Oceana's Bering Sea HAPC Proposal are to protect benthic habitat characterized by dense aggregations of *Gersemia sp* and other important living seafloor habitat from destruction by bottom trawling, and to protect the MEDNYY Seamount.

Corals, sponges, and other living seafloor are habitat that provides nurseries, places to feed, shelter from currents and predators, and spawning areas for many species of marine life including rockfish, Pacific Ocean perch, flatfish, Atka mackerel, golden king crab, shrimp, Pacific cod, pollock, greenling, greenland turbot, and sablefish. Corals have evolved in one of the most stable habitats on earth, too deep to be affected by tides and waves or sunlight. Consequently, they are extremely vulnerable to disturbance and are easily destroyed by a variety of fishing gears.

Seamounts are rare and exceptional formations that are essential fish habitat rich with the formation of living seafloor such as corals and sponges.

Oceana's Bering Sea Soft Corals and Seamounts proposal is completely contained within the designated essential fish habitat areas of the following FMP managed species: Pacific cod, yellowfin sole, flathead sole, rex sole, arrowtooth flounder, and walleye pollock.

Statement of purpose and need:

The eastern Bering Sea has experienced rapid and intensive development of commercial bottom trawl fisheries (McConnaughey et al. 2000). The expansion of the bottom trawl flatfish fleet has moved the industry into a region characterized by soft sediments with abundant sessile epifauna. Sea raspberries, *Gersemia sp.* are recorded in dense aggregations in the central Bering Sea. These dense aggregations of *Gersemia* have been noted nowhere else in Alaska.

Seamounts provide rich, concentrated, biodiverse ecosystems. However, indiscriminate destructive bottom trawling in delicate living seafloor habitat like corals, sponges, and other living substrates can irreversibly mar this unique environment. As an example, in 1999, a single pass of a bottom trawl removed 21 metric tons of coral and bryozoans from a pinnacle 27 nm offshore of Agattu Island in the Aleutians. With such dire impacts of destructive

bottom trawling, it is imperative to protect the HAPC invertebrates on other pinnacles, and on seamounts, from this kind of decimation.

Protection of pinnacles is not unprecedented. In 2000, NOAA Fisheries established the Sitka Pinnacles Marine Reserve in Southeast Alaska. Protection of deep sea corals and sponges was cited as a rationale for the Sitka Pinnacles Marine Reserve and the no-trawl zone in Southeast Alaska (Witherell and Coon 2000). Further, the rationale for closing the Sitka pinnacle to groundfish fishing acknowledged “the pinnacles habitat is fragile, and the concentration of fishes in a relatively small, compact space can lend itself to overfishing of certain species, particularly lingcod, at sensitive life stages” (Federal Register, Vol. 65, No. 218). The Sitka reserve boasts fantastic aggregations of marine life including lingcod, rockfish, corals and sponges, among others.

Additionally, world fisheries have a documented geographic and depth expansion (Pauly et al., 2003). It is important to protect unexploited areas from future expansion to deeper, previously unfishable areas until there is better understanding of deepwater communities (Koslow et al., 2000).

A description of how the proposed HAPC addresses the four considerations set out in the final EFH regulations:

NOAA Fisheries has identified corals and sponges in Alaska as HAPC as indicated in Amendment 55 to the Groundfish FMPs (1998). Additionally, in a letter from Dr. William Hogarth to Mr. Jim Ayers dated September 9, 2002, Dr. Hogarth stated, “Corals, sponges, and other living substrate in waters off Alaska are already classified by NOAA Fisheries as Habitat Areas of Particular Concern deserving of special protection because of their importance as habitat and their vulnerability to human impacts.”

1. Ecological importance: does the habitat perform an important ecological function?

Gersemia are soft corals that provide structure on the soft substrates of the central Bering Sea. *Gersemia* provide vertical relief and habitat structure on the generally low topographic structure of the eastern Bering Sea. Removal of habitat structure in soft sediments significantly decreases biodiversity (Thrush et al. 2001). Commercial bottom trawling can significantly change community structure of benthic communities (Thrush et al. 1998). Juvenile halibut and rock sole exhibit strong preference for benthic habitat structure (Stoner and Titgen 2003). Habitat choice was significantly influenced by density of structures. Field observations of juvenile halibut and rock sole with tows supported affinity for biogenic structure (Stoner and Titgen 2003).

Pinnacles and seamounts provide an obstacle to water flow that creates upwelling of currents and consequently nutrients. This nutrient rich water flow promotes complex and dense ecosystems on these undersea structures which includes corals and sponges. Deep water corals and sponges provide high quality fish habitat. The vertical structure formed by these coral colonies provides relief on the seafloor, increases habitat complexity, increases niche breadth, and increases biodiversity. Sessile epifauna increase habitat complexity and play an important factor in structuring benthic communities (Bradshaw et al. 2003). Pinnacles and seamounts support a rich diversity of species in a small area and are worthy of special protection.

2. Sensitivity: the extent to which the habitat is sensitive to human induced environmental degradation

Areas characterized by low natural disturbance and long lived species are the most sensitive to anthropogenic disturbance (NRC, 2002). The seafloor of the Bering sea has rich aggregations of soft corals that are easily destroyed by bottom trawling.

3. Exposure: whether, and to what extent, development activities are, or will be stressing the habitat

The abundance of soft corals in the Bering Sea may be due to the fact that the area was relatively lightly fished until recently. Intensive bottom trawling in the area is resulting in high bycatch of *Gersemia* which may be beyond sustainable limits. From 1990 to 2002, over 87 metric tons of soft corals were removed from the area east of the Pribilofs and 20 metric tons were removed from the area northwest of Unimak.

Bottom trawling alters the physical structure of the seafloor, reduces habitat complexity, and changes the composition of benthic communities. Bottom trawling removes epifauna, thereby reducing habitat complexity and species diversity of the benthic community (Collie et al. 2000, Kaiser et al. 2000). According to the National Academy of Sciences, if disturbance from trawling exceeds the resiliency threshold, then irrevocable long-term

ecological effects will occur. Gravel pavement substrate disturbed by bottom trawling on Georges Bank in the Northeast Atlantic, for example, had significantly less emergent epifauna, shrimp, polychaetes, brittlestars, and small fish than undisturbed sites (Collie et al., 2000). Scavenging organisms tended to dominate communities in areas of high dredging disturbance while long-lived organisms and fragile taxa disappeared (Collie et al. 1997).

Bottom trawling decreases benthic productivity. Trawled areas of the North Sea, off the coast of Ireland, were significantly less productive when compared to untrawled areas of similar habitat type (Jennings et al. 2001). Areas disturbed by mobile fishing gear on Georges Bank had lower levels of benthic production (both biomass and energy) when compared to undisturbed areas (Hermesen et al. 2003).

4. Rarity: the rarity of the habitat type

Dense aggregations of *Gersemia* sp. are unique and have been recorded nowhere else in Alaska.

There is only one seamount in the Bering Sea.

Proposed management measures and their specific objectives, if appropriate:

We have identified two areas of dense aggregations of *Gersemia* sp., described below.

The dense aggregations of soft corals need further research. NOAA Fisheries should make a determination to the extent to which bottom trawling damages these HAPC invertebrates. Appropriate mitigation measures and restrictions should be taken.

For the seamount, there should be a moratorium on commercial fishing.

Proposed solutions to achieve these objectives: (how might the problem be solved?) Include concepts of methods of measuring progress towards those objectives.

NOAA Fisheries should design an experiment of appropriate size and duration to assess the effects and recovery if any of bottom trawling on these HAPC invertebrates, compared to a control area which is closed to commercial bottom trawling. This research should not delay or replace immediate mitigation measures and protection.

Consistent with the Council and agency's discussion, this HAPC proposal assumes that currently closed or restricted areas would remain closed or restricted.

For the seamount, as a precautionary measure, there should be a moratorium on commercial fishing in these areas until they can be explored, the benthic habitat mapped, populations of seamount species estimated, and until NOAA Fisheries determines that a fishery can be conducted without habitat destruction.

Expected benefits to the FMP species of the proposed HAPC, and supporting information/data:

Oceana's Aleutian Bering Sea Soft Corals and Seamounts HAPC proposal is completely contained within the designated essential fish habitat areas of the following FMP managed species: Shortraker rockfish, rougheye rockfish, northern rockfish, Atka mackerel, Pacific cod Pacific ocean perch, and Golden king crab.

The areas protected in this proposal are ecologically important for many reasons, including as habitat for commercially exploited groundfish species. Soft corals in the Bering Sea were found to be in close association with gadids (e.g. Pacific Cod and Walleye Pollock), Greenland turbot, greenlings, and other flatfish (Heifetz 2002). Corals provide essential habitat for a variety of marine species including several species of rockfish, king crab, Atka mackerel, shrimp, Pacific cod, walleye pollock, Greenland turbot, greenlings, and other flatfish (Krieger 1999). Rockfish and Atka mackerel are associated with gorgonian coral, hydrocoral and cup corals (Heifetz 2002). Krieger (1993) noted that juvenile Pacific ocean perch exhibit a preference for rugged areas containing cobble-boulder and epifaunal cover and that shortraker rockfish strongly prefer rugged, high-profile habitat interspersed with boulders. Carlson and Straty (1981), Straty (1987), and Percy et al. (1989) found that juvenile rockfish exhibit a preference for high-relief habitat. Juvenile and adult *Sebastes* sp. were often found in association with *Primnoa* spp. during

underwater video surveys of rockfish habitat in southeast Alaska (Bizzarro, 2002). Corals may be important for growth to maturity for demersal slope rockfish (EFH EIS).

Research from around the world indicates the destruction of living seafloor negatively impacts fish populations. Destruction of bryozoan growths by trawling in Tasman Bay, New Zealand resulted in a marked reduction in numbers of associated juvenile fish (Turner et al. 1999). Predation rate on juvenile Atlantic cod (*Gadus morhua*) increases with decreasing habitat complexity (Walters & Juanes 1993). Case studies in New Zealand and Australia suggested that loss of habitat structure through removal of large epibenthic organisms by fishing had negative effects on associated fish species (Turner et al. 1999). Removal of epifaunal organisms like corals may lead to the degradation of habitat such that it is no longer suitable for associated fish species (Auster et al. 1996).

Protecting habitat areas from fishing impacts has positive effects. In an area of the Irish Sea, for example, an 11 year closure to scallop dredging increased hydroid colonies (Bradshaw et al. 2003). Hydroid colonies increased diversity and abundance of benthic fauna as well as recruitment of juvenile scallops (Bradshaw et al. 2003). A model of trawl closures around locations where trawl “hangs” occurred showed that prohibiting trawling in areas with structural complexity had positive effects on juvenile Atlantic cod (Link & Demerest, 2003).

Identification of the fisheries, sectors, stakeholders and communities to be affected by the establishment of the proposed HAPC (Who benefits from the proposal and who would it harm?) and any information you can provide on socioeconomic costs, including catch data from the proposed area over the last five years:

We have identified two areas of dense *Gersemia* sp. The first area, east of the Pribilofs encompasses approximately 88 fishing blocks, or 8,800 km² where bottom trawling was observed from 1990-2002. The primary target of the trawl fleet in this area was flatfish. The second area, northwest of Unimak encompasses 20 fishing blocks, or 2,000 km² where bottom trawling was observed from 1990-2002. If NOAA Fisheries were to close an experimental area to bottom trawling, the economic impacts would likely be minimal.

Further economic assessments may be conducted in the HAPC National Environmental Policy Act process.

The proposed seamount commercial fishing closures would have no economic impact.

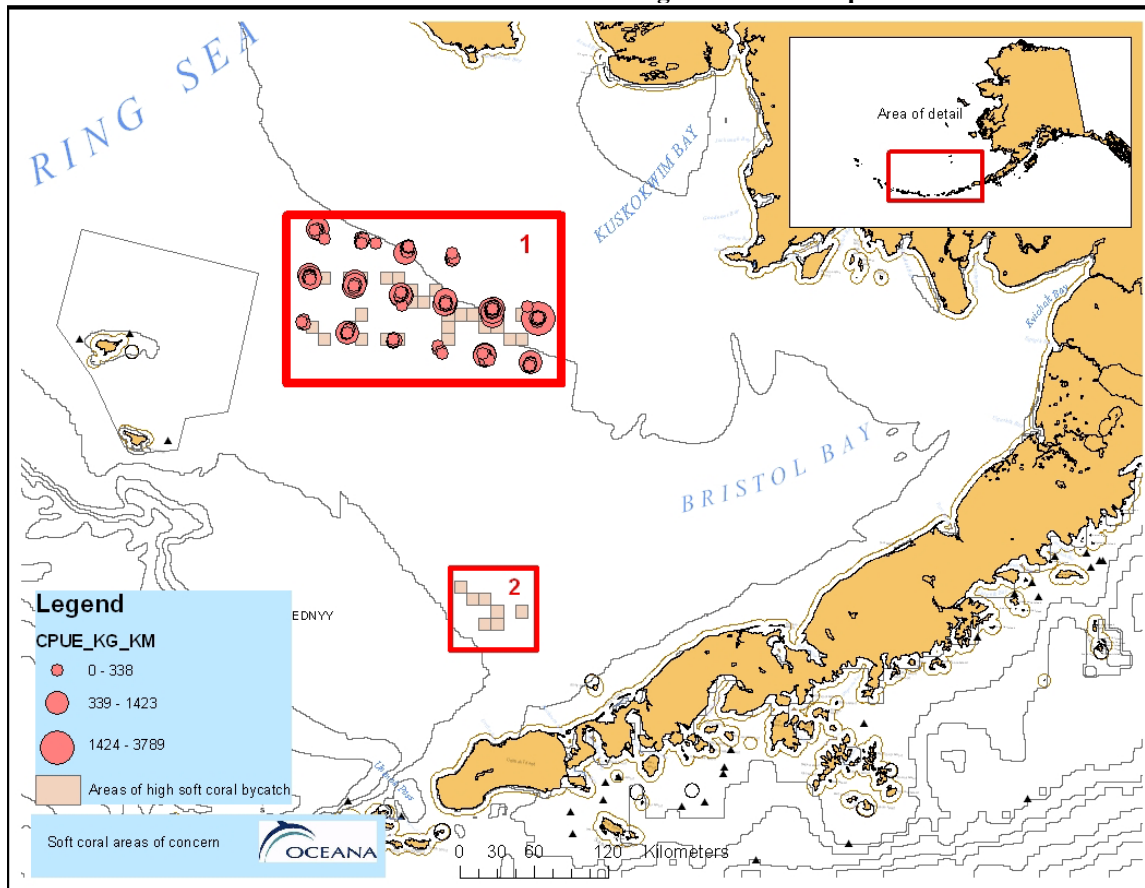
Clear geographic delineation for proposed HAPC (example written latitude and longitude reference points and/or delineation on an appropriately scaled NOAA chart):

Map 1 identifies two areas of dense aggregations of *Gersemia* sp.

Map 2 identifies the MEDNYY seamount. Table 1 provides the latitude and longitude reference points for the MEDNYY seamount.

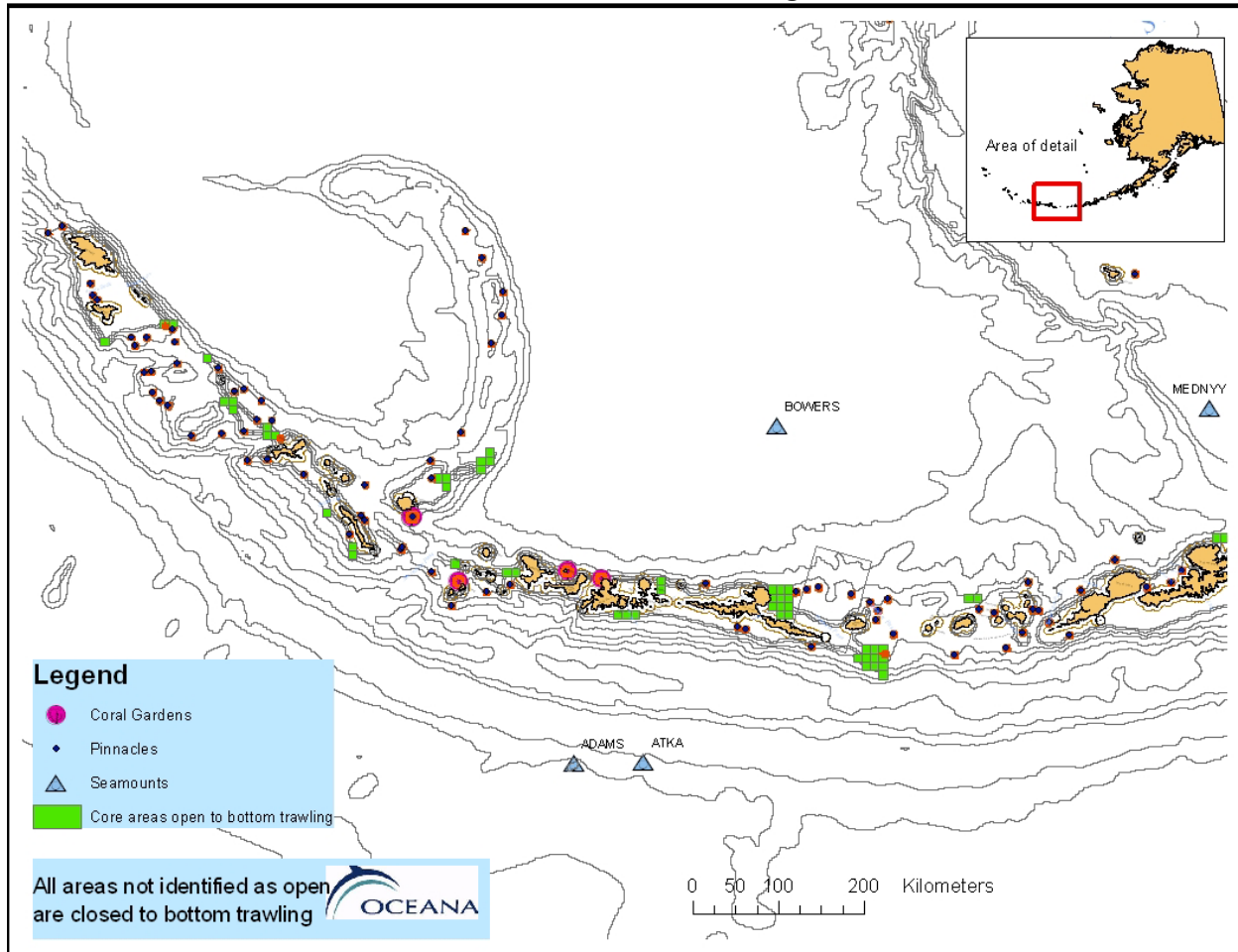
Map

Overview of Oceana Bering Sea HAPC Proposal



Map 1: Dense Sea Raspberry aggregations in the Bering Sea

MEDNYY Seamount in the Bering Sea



Map 2: MEDNYY Seamount in the Bering Sea

Table 1: Seamounts in the Bering Sea

NAME	DEPTH (m)	LAT (dec. degrees)	LONG (dec. degrees)
MEDNYY	-526	55.420	-167.280

Provide best available information and sources of such information to support the objectives for the proposed HAPC. (Citations for common information or copies of uncommon information):

Data Acquisition and Assumptions:

The following section describes the information and process Oceana used to develop proposed HAPC designations and associated management measures.

The precision and accuracy of our analyses is necessarily limited by the precision and accuracy of the underlying information. Our requests to the Fisheries Service for observer data were provided in aggregated 10x10 km blocks. The blocks, or “grids” are referenced by a master gridcode. Blocks displayed in figures in this proposal can be referenced to latitude/longitude coordinates on navigational charts. We used these data to analyze fishing effort and the approximate economic value of fishing areas. Data at this resolution covered approximately 90% of groundfish fishery effort (Ren Narita, AFSC pers. comm.). A necessary assumption for the analysis was that fishing effort was uniform across a given block. For example, a closed area within a block would have an economic impact proportional to the percentage of the block that was closed. As such, an area of 25 km² closed to a certain gear type within a 100 km² fishing block where \$1 million ex-vessel fish value was caught would result in an economic impact of \$250,000 of lost revenue. Another assumption is that unobserved vessels fished in the same blocks as observed vessels.

In addition to using observer data, we also incorporated information from the NOAA RACEBASE trawl survey database. Trawl survey end points were plotted as point locations and the catch per unit effort for coral species or species groups was noted. Catch per unit effort in kilograms per square kilometer was calculated by dividing sample weight by area swept. Area swept was calculated as the net width multiplied by trawl distance.

The location of the seamount was obtained from MCBI's oceanographic data CD-rom (MCBI, 2003).

Methods:

We analyzed twelve years of fishery observer data of the bottom trawl fleet to identify the most important and heavily trawled areas.

Relevant Literature:

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